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ABSTRACT

A simulated micro-society simulation/game was applied as an experimental treatment to compare the impact of high and low rate of change social environments upon individual's time perspectives. Subjects were 187 university undergraduate and graduate students who completed the covariate "Social Readjustment Rating Scale" and then were randomly assigned to one of two 65 minute simulations, one in which a simulated environment feature changed every 30 seconds, and another version in which simulation features changed every 30 minutes. The "Future Changing Society Simulation" (FCSS), which was adapted from Garry Shirts' STARPOWER and "Future Planning Games" by Bender and McCuen, has several rule changes at the beginning of every trading round, scoring system changes, seat changes, with bonus points offered to accelerate trading. The norms and sanctions governing behavior are therefore constantly changing, requiring rapid learning of new standards of conduct. Players are also required to select and disclose a new viewpoint at the beginning of every trading round in areas including preferred personal life style, political philosophy, family and sexual roles, who should be included in an ideal community, type of society, and model for word order. Data is currently being analyzed on the impact of the FCSS simulation on time perspectives, with the expectation that a highly changing, unpredictable environment may produce individuals little concerned with the distant future. (Author/BM)

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Experimental Simulation of "Future Shock" to Explore Time Perspectives under Different Rates of Change

Charles M Plummer

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ABSTRACT

Experimental Simulation of "Future Shock" to Explore Time Perspectives under Different Rates of Change

A simulated micro-society simulation/game was applied as an experimental treatment to compare the impact of high and low rate of change social environments upon individual's time perspectives. Subjects were 187 university undergraduate and graduate students who completed the covariate "Social Readjustment Rating Scale" (Holmes and Rahe, 1967) and then were randomly assigned to one of two sixty-five minute simulations, one in which a simulated environment feature changed every thirty seconds, and another version in which simulation features changed every thirty minutes.

Toffler maintains that the primary determinants of "future shock" are 1) transience (temporariness), 2) novelty (newness), and 3) diversity (variety) in information, people, organizations, places and things.

With this in mind, the framework of Garry Shirts' STARPOWER was modified to vary 1) the game characteristics or rules (information), 2) players, i.e., the number of different viewpoints they are forced to disclose and change, as well as the amount of interaction that occurs through trading (people), 3) group membership (organizations), 4) seats (places), and 5) chip values (things).

The resulting "Future Changing Society Simulation" (FCSS) has several rule changes at the beginning of every trading round, scoring system changes, seat changes, with bonus points offered to accelerate trading. The norms and sanctions governing behavior are therefore constantly changing, requiring rapid learning of new standards of conduct.

In the FCSS version, players are required to select and disclose a new viewpoint at the beginning of every trading round in areas adapted from "Future Planning Games" by Bender and McCuen, 1972. These areas include preferred personal life style, political philosophy, family and sexual roles, who should be included in an ideal community, type of society, and model for word order.

Data is currently being analyzed on the impact of the FCSS simulation on time perspectives, with the expectation that a highly changing, unpredictable environment may produce individuals little concerned with the distant future.

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Objectives

Toffler (1965) initiated the term "future shock" to "describe the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time." He maintained that when environmental change is accelerated, a foreshortening of time perspective occurs and adaptive responses severely decline once this change threshold is passed.

While experimentally manipulating relationships between the pace of environmental change in a simulated society, and while producing differing levels of resources controlled by individuals, this experiment sought to test hypothesis specifying characteristics of human time perspectives when the relationship between individual effort and environmental change had been varied.

Theoretical Framework

Based upon theoretical propositions derived from Lewin (1946), Fraisse (1963), and Doob (1971), one major determinant of time perspective was expected to be the relative degree to which the individual controls the resources essential to achieving his intended goal. The greater the degree to which the individual has control over resources instrumental in goal attainment, the more he would be expected to be future-oriented, since progress toward a goal can be accelerated when relevant resources are responsive to manipulation.

In addition to the resources controlled variable, another problem of theoretical interest (Toffler, 1976; Singer, 1974) is the double bind the individual is placed in when confronted with an accelerated pace of change: anticipation into the more distant future is needed since the "future" arrives sooner, but multiple rapid changes render more of one's prior experience irrelevant. Transient, novel and diverse events are so pressing that the individual must focus much or all of his attention upon present reality to minimally cope. In this situation, a restriction in future time perspective is anticipated.

Methods and/or Techniques

The design and application of a simulation/game as an experimental treatment may simultaneously (1) simulate real world social systems undergoing different rates of change, while (2) producing differences in rates of change and resources controlled by individuals to test the impact of these variables upon dimensions of these individuals' time perspectives.

Data Source

A simulated micro-society simulation/game was designed and applied as an experimental treatment to compare the impact of high and low rate of change social environments, and differential level of resource control, upon individuals' time perspectives. Subjects were 187 university undergraduate and graduate students who completed the covariate "Social Readjustment Rating Scale" (Holmes and Rahe, 1967) and then were randomly assigned to cells of a 3 x 2 factorial design: one of two sixty-five minute simulations (one in which a simulated environment feature changed every thirty seconds, and another version in which simulation features changed every three minutes), and one of three levels of resource control (High, Medium, and Low) within the simulation.

Toffler maintains that the primary determinants of "future shock" are (1) transience (temporariness), (2) novelty (newness), and (3) diversity (variety) in information, people, organizations, places and things.

With this in mind, the framework of STARPOWER (Shirts, 1969) was modified to vary (1) the game characteristics of rules (information), (2) players, i.e., the number of different viewpoints they are forced to disclose and change, as well as the amount of interaction that occurs through trading (people), (3) group membership (organizations), (4) seats (places), and (5) chip values (things). A multi-mediated, audio-tape controlled simulation was then run simultaneously with 187 subjects and 8 experimenters.

The resulting "Future Changing Society Simulation" (FCSS) accelerated version of the experimental treatments has several rule changes at the beginning of every trading round, scoring system changes, and seat changes, with bonus points offered to accelerate trading. The norms and sanctions governing behavior are therefore constantly changing, requiring rapid learning of new standards of conduct.

In the FCSS version, players are required to select and disclose a new viewpoint at the beginning of every trading round in areas adapted from "Future Planning Games" by Bender and McCuen, 1972. These areas include preferred personal life style, political philosophy, family and sexual roles, who should be included in an ideal community, type of society, and model for world order.

In addition to manipulation checks, several time perspective measures were administered immediately following the simulation, including the "Self-Anchoring Striving Scale" (Cantril, 1965), "Chronologic Scale" (Plummer, 1971), "Lines Test" (Cottle and Pleck, 1969), "Affective View of the Future Scale" (Bauer and Gillies, 1972), "Future Planning Scale" (Plummer, 1975), the "Time Metaphor Test" (Knapp and Garbutt, 1958), and an estimate of the elapsed duration of the experiment.

Results and/or Conclusions

(1) The life change unit scores of the "Social Readjustment Rating Scale" were found to be significantly positively correlated with several of the dependent measures, and were included in the analysis as a covariate.

(2) The comparison of actual elapsed simulation time to the duration of referent real world events perceived by S's as being simulated produced a "time correspondence" ratio. When the mean response of S's was used as

the basis for the calculation, 1 hour of simulation time = 1 month of real world time, or the ratio was 1:720.

(3) Analysis of "Lines Test" Time Zone scores indicated that S's experiencing the high rate change simulation had significantly more restricted "personal future" scores ($p = .01$), and had a significantly more constricted "life space" score ($p = .02$) than those S's experiencing the slower rate of change simulation.

(4) Several "Chronologic Scale" responses were significant, indicating (a) that time perspective was more restricted ($p = .04$) for individuals who controlled moderate resources, rather than either high or low resources, irrespective of the levels of change; and (b) responses extending into either the more distant future or past, but excluding the present time frame, were more frequently made ($p = .04$) by individuals controlling moderate resources when compared to high and low resource groups, although there was a slight tendency for those experiencing the high change simulation to more frequently exclude or transcend the present ($p = .11$).

(5) The high resources group was significantly more optimistic ($p = .01$) when compared to the medium and low resources group on the "Affective View of the Future" Scale, with no significant difference appearing between the high and low change treatment groups.

(6) Although no significant differences emerged in the "Self-Anchoring Striving Scales" among treatment conditions, individuals on the average rated their expected future life situation 20 years from now 1.77 times better or 57% better than their past situation five years ago.

(7) The "Alternative Future Planning Scale" (Plummer, 1975) total scores approached statistical significance, with high change subjects tending to be somewhat less likely to value planning activities than low change subjects ($p = .065$). There was a tendency for those controlling the highest levels of resources to rate planning activities as somewhat less useful than medium or low resource groups ($p = .105$). Four of seven items comprising this instrument were significantly related to either the resources or change factors at p .05, with the pattern of results generally following that of the total scores on this instrument. The Social Readjustment Rating Scale covariate scores were significantly related to planning scores ($p = .003$), suggesting that those experiencing more life changes in the previous twelve months attributed greater importance to planning.

(8) On the "Time Metaphor Test," those experiencing the high change version responded by selecting metaphors that indicated that time subjectively passed significantly faster ($p = .004$) than the low change subjects. Those controlling the highest level of resources perceived time as passing significantly faster ($p = .023$) than the medium and low resources people.

(9) Although all treatments were controlled by audio-tape lasting 65 minutes, subjects who participated in the high change version of the simulation estimated the elapsed duration to be 57.61 minutes, which was significantly less ($p = .001$) than the mean estimate of 70.01 minutes made by those experiencing the low change version.

Educational/Scientific Importance

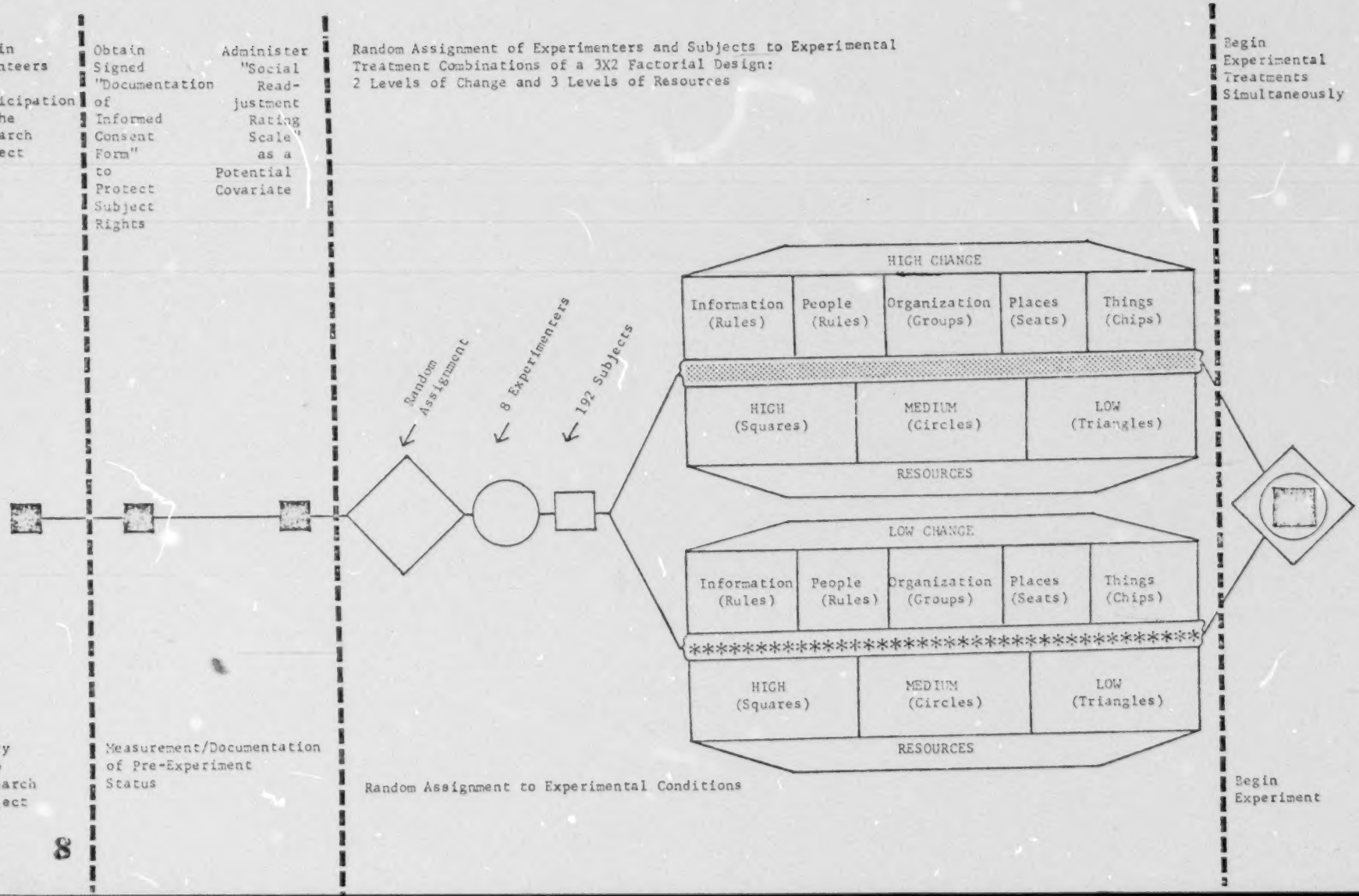
Disclosure of the impact of changes experimentally manipulated in a social environment upon human time perspectives may potentially be of

practical use in disclosing:

(1) how best to develop a "future-focused role image" (Singer, 1974), or ways to change personal feelings about control over the future (Stotland, The Psychology of Hope, 1969 and DeCharms, Personal Causation, 1968).

(2) disclosing the psychological components of a "futures perspective" (Sandow, 1973), and conditions conducive to greater tolerance for ambiguity or suspended judgement concerning alternative futures.

(3) determining the time perspectives that occur under conditions designed to produce "future shock" (Toffler, 1965, 1970, 1974) may be useful in minimizing these factors in educational environments.


tain
lunteers
r
rticipation
the
search
roject
Obtain Signed "Documentation of Informed Consent Form" to Protect Subject Rights
Administer "Social Readjustment Rating Scale" as a Potential Covariate
Random Assignment of Experimenters and Subjects to Experimental Treatment Combinations of a 3X2 Factorial Design: 2 Levels of Change and 3 Levels of Resources
Begin Experimental Treatments Simultaneously
Random Assigment
8 Experimenters
192 Subjects
HIGH CHANGE
Information (Rules)
People (Rules)
Organization (Groups)
Places (Seats)
Things (Chips)
HIGH (Squares)
MEDIUM (Circles)
LOW (Triangles)
RESOURCES
LOW CHANGE
Information (Rules)
People (Rules)
Organization (Groups)
Places (Seats)
Things (Chips)
HIGH (Squares)
MEDIUM (Circles)
LOW (Triangles)
RESOURCES
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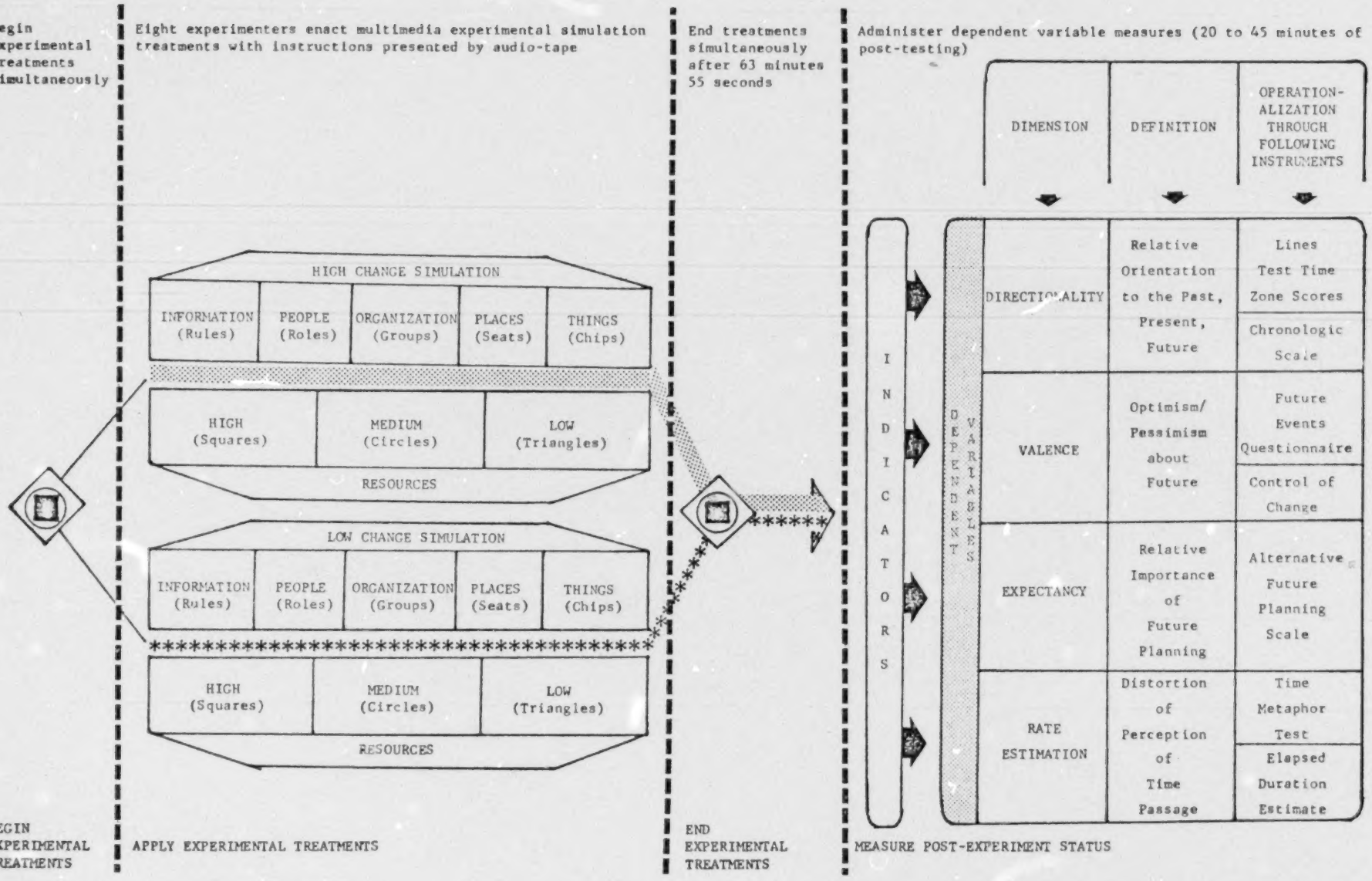
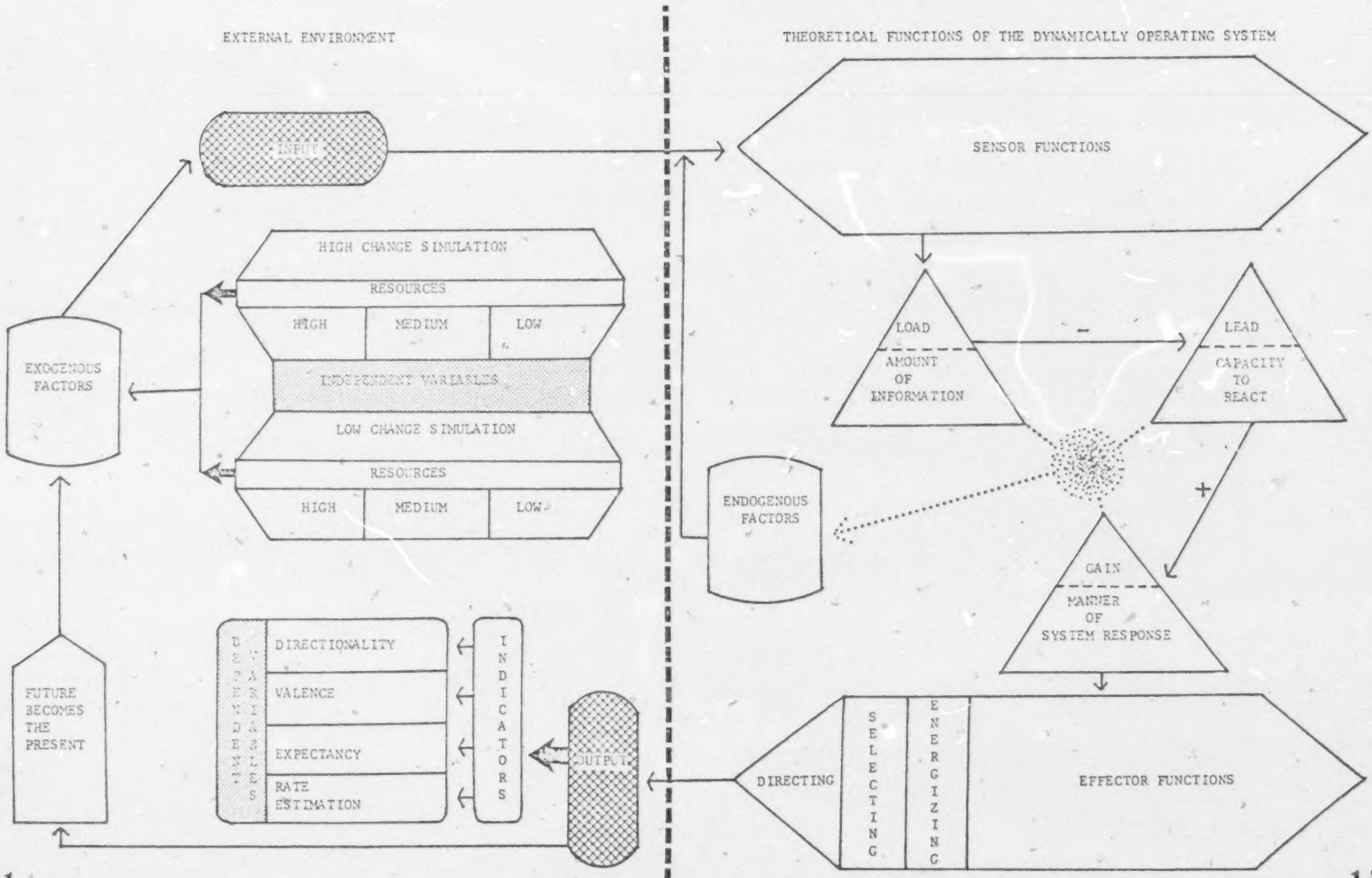
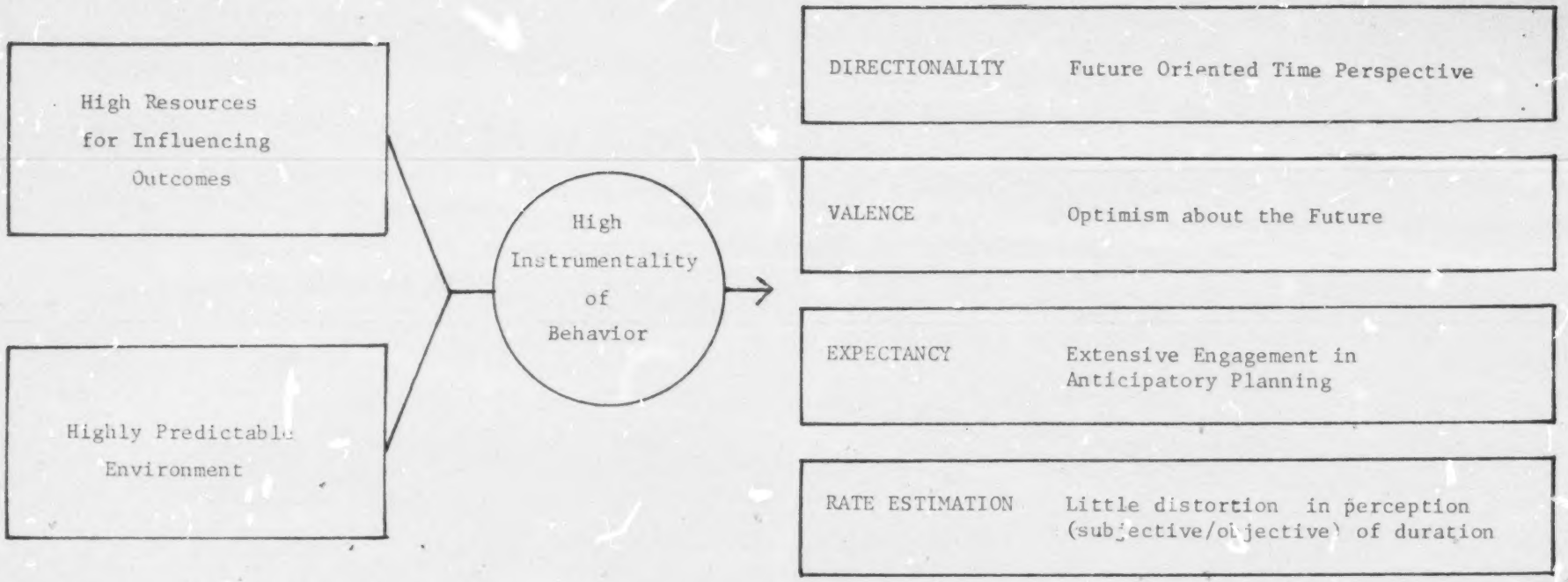
nto
esearch
roject
Measurement/Documentation of Pre-Experiment Status
Random Assignment to Experimental Conditions
Begin Experiment

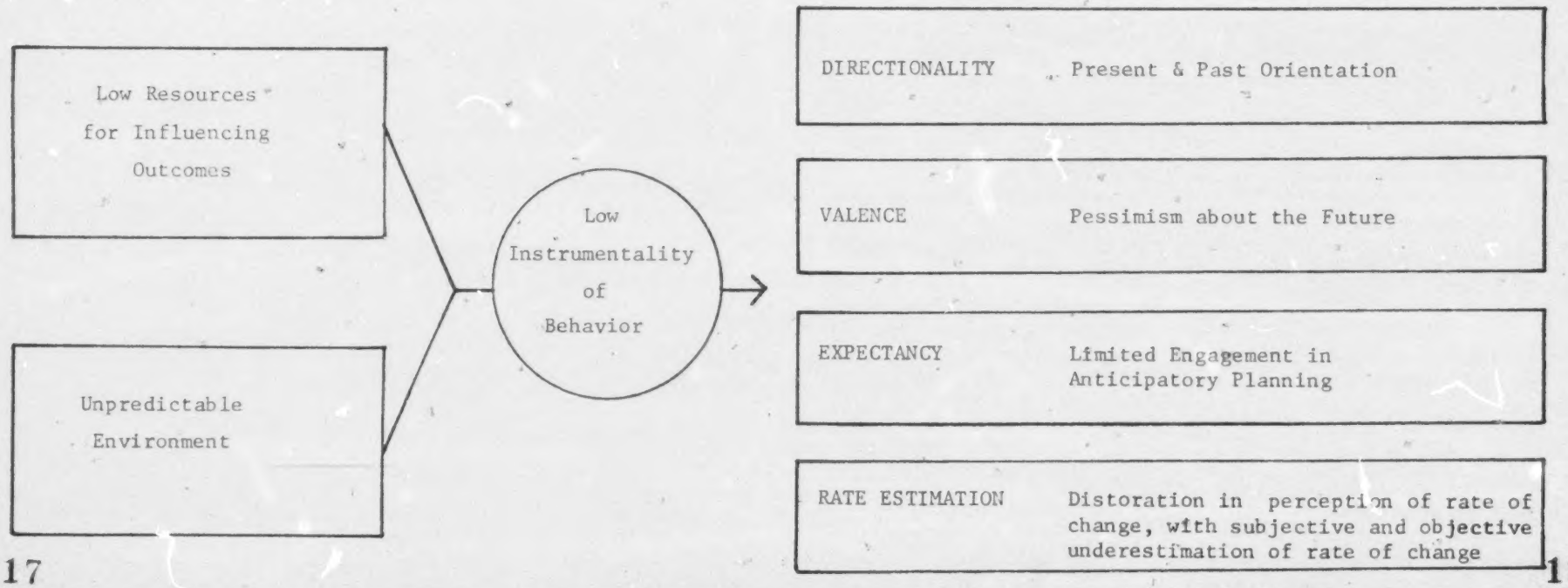

Begin experimental treatments simultaneously
Eight experimenters enact multimedia experimental simulation treatments with instructions presented by audio-tape
End treatments simultaneously after 63 minutes 55 seconds
Administer dependent variable measures (20 to 45 minutes of post-testing)
HIGH CHANGE SIMULATION
INFORMATION (Rules)
PEOPLE (Roles)
ORGANIZATION (Groups)
PLACES (Seats)
THINGS (Chips)
HIGH (Squares)
MEDIUM (Circles)
LOW (Triangles)
RESOURCES
LOW CHANGE SIMULATION
INFORMATION (Rules)
PEOPLE (Roles)
ORGANIZATION (Groups)
PLACES (Seats)
THINGS (Chips)
HIGH (Squares)
MEDIUM (Circles)
LOW (Triangles)
RESOURCES
DIMENSION
DEFINITION
OPERATIONALIZATION THROUGH FOLLOWING INSTRUMENTS
INDICATORS
DEPENDENT VARIABLES
DIRECTIONALITY
Relative Orientation to the Past, Present, Future
Lines Test Time Zone Scores
Chronologic Scale
VALENCE
Optimism/ Pessimism about Future
Future Events Questionnaire
Control of Change
EXPECTANCY
Relative Importance of Future Planning
Alternative Future Planning Scale
RATE ESTIMATION
Distortion of Perception of Time Passage
Time Metaphor Test
Elapsed Duration Estimate
BEGIN EXPERIMENTAL TREATMENTS
APPLY EXPERIMENTAL TREATMENTS
END EXPERIMENTAL TREATMENTS
MEASURE POST-EXPERIMENT STATUS

			RESOURCES			
			High Resources (Squares)	Medium Resources (Circles)	Low Resources (Triangles)	
CHANGE	High Change Simulation Version	Experimenter 1	Subjects 1-8 (n=8)	Subjects 9-16 (n=8)	Subjects 17-24 (n=8)	(n=96)
		Experimenter 2	Subjects 25-32 (n=8)	Subjects 33-40 (n=8)	Subjects 41-48 (n=8)	
		Experimenter 3	Subjects 49-56 (n=8)	Subjects 57-64 (n=8)	Subjects 65-72 (n=8)	
		Experimenter 4	Subjects 73-80 (n=8)	Subjects 81-88 (n=8)	Subjects 89-96 (n=8)	
	Low Change Simulation Version	Experimenter 5	Subjects 97-104 (n=8)	Subjects 105-112 (n=8)	Subjects 113-120 (n=8)	(n=96)
		Experimenter 6	Subjects 121-128 (n=8)	Subjects 129-136 (n=8)	Subjects 137-144 (n=8)	
		Experimenter 7	Subjects 145-152 (n=8)	Subjects 153-160 (n=8)	Subjects 161-168 (n=8)	
		Experimenter 8	Subjects 169-176 (n=8)	Subjects 177-184 (n=8)	Subjects 185-192 (n=8)	
			(n=64)	(n=64)	(n=64)	N=192


EXTERNAL ENVIRONMENT
THEORETICAL FUNCTIONS OF THE DYNAMICALLY OPERATING SYSTEM
INPUT
SENSOR FUNCTIONS
HIGH CHANGE SIMULATION
RESOURCES
HIGH
MEDIUM
LOW
INDEPENDENT VARIABLES
LOW CHANGE SIMULATION
RESOURCES
HIGH
MEDIUM
LOW
EXOGENOUS FACTORS
LOAD
AMOUNT OF INFORMATION
LEAD
CAPACITY TO REACT
ENDOGENOUS FACTORS
GAIN
MANNER OF SYSTEM RESPONSE
FUTURE BECOMES THE PRESENT
DEPENDENT VARIABLES
DIRECTIONALITY
VALENCE
EXPECTANCY
RATE ESTIMATION
INDICATORS
OUTPUT
DIRECTING
SELECTING
ENERGIZING
EFFECTOR FUNCTIONS

DIMENSION	Definition	Operationalization through following Indicators (Instruments)
DIRECTIONALITY	Relative Orientation to the Past, Present, Future	Lines Test Time Zone Scores Chronologic Scale
VALENCE	Optimism/ Pessimism about Future	Future Events Questionaire Control of Change
EXPECTANCY	Relative Importance of Future Planning	Alternative Future Planning Scale
RATE ESTIMATION	Distoration of Perception of Time Passage	Time Metaphor Test Elapsed Duration Estimate


High Resources for Influencing Outcomes
Highly Predictable Environment
High Instrumentality of Behavior
DIRECTIONALITY
Future Oriented Time Perspective
VALENCE
Optimism about the Future
EXPECTANCY
Extensive Engagement in Anticipatory Planning
RATE ESTIMATION
Little distortion in perception (subjective/objective) of duration


Low Resources for Influencing Outcomes
Unpredictable Environment
Low Instrumentality of Behavior
DIRECTIONALITY
Present & Past Orientation
VALENCE
Pessimism about the Future
EXPECTANCY
Limited Engagement in Anticipatory Planning
RATE ESTIMATION
Distoration in perception of rate of change, with subjective and objective underestimation of rate of change

SOCIAL READJUSTMENT RATING SCALE

Rank	Life Event	Mean Value
1	Death of Spouse	100
2	Divorce	73
3	Marital separation	65
4	Jail term	63
5	Death of close family member	63
6	Personal injury or illness	53
7	Marriage	50
8	Fired at work	47
9	Marital reconcilliation	45
10	Retirement	45
11	Change in health of family member	44
12	Pregnancy	40
13	Sex difficulties	39
14	Gain of new family member	39
15	Business readjustment	39
16	Change in financial state	38
17	Death of close friend	37
18	Change to different line of work	36
19	Change in number of arguments with spouse	35
20	Mortgage over $10,000	31
21	Foreclosure of mortgage or loan	30
22	Change in responsibilities at work	29
23	Son or daughter leaving home	29
24	Trouble with in-laws	29
25	Outstanding personal achievement	28
26	Wife begin or stop work	26
27	Beginoor end school	26
28	Change in living conditions	25
29	Revision of personal habits	24
30	Trouble with boss	23
31	Change in work hours or conditions	20
32	Change in residence	20
33	Change in schools	20
34	Change in recreation	19
35	Change in church activities	19
36	Change in social activities	18
37	Mortgage or loan less than $10,000	17
38	Change in sleeping habits	16
39	Change in number of family get-togethers	15
40	Change in eating habits	15
41	Vacation	13
42	Christmas	12
43	Minor violations of the law	11

From Holmes and Rahe, 1967, Table 3, page 216.

ELEMENT	SIMULATION CHARACTERISTIC	HIGH CHANGE SIMULATED SOCIETY NUMBER OF UNITS CHANGING	LOW CHANGE SIMULATED SOCIETY NUMBER OF UNITS CHANGING
Information	Rules	9*	3*
People	Values Disclosure	18	1
	Amount of Interaction (Trades)	33*	8*
Organizations	Group Membership Changes (Mobile-Stable)	15*	7*
Places	Seat Changes	3	1
Things	Chips (Point value of colors)	15	0
	Diversity Index (total number of units)	93	20
	Transience Index (Average Duration of units)	38.6 seconds	180 seconds

*Note: An asterisk indicates estimated average

Operationalization of Two Levels of Diversity and Transience Within the Simulation

Real World	Model	Simulation
Laws, Regulations, Policies, Standards of Conduct and Goals	Information	Rules
Different Philosophies, Religions, Ages, Sexes, and Politics	People	Roles and Viewpoints
Upper, Middle, Lower Class; Haves vs. Have Nots; Males vs. Females; Powerful-Powerless; Masters-Slaves	Organizations	Groups
Home, Work, Neighborhood, Community, Town, City, County, Nation, Continent, Political Block, Planet	Place	Seats
A lot or a little Money, Experience, Skill, Personality, Education, Attractive Appearance	Things/Resources	Chips

Rules: The rules change during the first two rounds, and then in the third round those with the most points are given total power to make new rules that will keep them on top.

Roles: Everybody is forced to change their outlook every trading round. If you hold the "right" viewpoint, you get a bonus. Although you introduce yourself to one another, what your viewpoint is doesn't affect the points you have to trade, since that has been "rigged" beforehand.

Groups: Membership in groups is largely determined by the rigging of the game (random assignment to biased resource levels).

Seats: Seats are changed several times, like when you move your home or job location.

Chips: Chip point values change several times, just like when you travel through several countries with different monetary systems.

RULES
ROUND ONE

1. ALL CHIPS MUST BE KEPT HIDDEN.
2. PLAYERS MUST HOLD HANDS TO EVEN BEGIN TALKING.
3. PLAYERS MUST KEEP HOLDING HANDS UNTIL A TRADE HAS BEEN MADE.
4. YOU MUST TELL YOUR VIEWPOINTS IN ALL 4 AREAS AND LISTEN TO OTHER'S STATEMENTS.
5. ALL TRADES MUST BE ONE CHIP FOR ONE CHIP.
6. CHIPS OF THE SAME COLOR CANNOT BE TRADED FOR EACH OTHER.
7. IF YOU DO NOT WISH TO TRADE, SIMPLY FOLD YOUR ARMS.
8. A MAJORITY VOTE CAN EXPEL A PLAYER FROM A GROUP.

POINTS				
SCORING FOR COLORS	POINTS	SAME COLOR	POINTS	TRADING BONUS
YELLOW	80	5	25	25
GREEN	25			
RED	15	4	15	
WHITE	10			
BLUE	5	3	10	

RULES
ROUND TWO

1. YOU MUST SHOW ALL OF YOUR CHIPS FIRST, BEFORE YOU CAN TRADE.
2. YOU MUST HOLD HANDS WITH AT LEAST TWO PEOPLE AT ONCE BEFORE YOU CAN EVEN BEGIN TALKING. ALL THREE PLAYERS MUST KEEP HOLDING HANDS UNTIL A TRADE HAS BEEN MADE. AS SOON AS ONE (ONE) TRADE HAS BEEN MADE, THIS GROUP CAN BREAK UP. ANYONE IN THE GROUP CAN TRADE WITH ANYONE ELSE IN THE GROUP, BUT ONLY ONCE.
3. YOU CAN NOT TRADE WITH THE SAME PERSON MORE THAN ONCE DURING THE TRADING BOARD.
4. TRADES CAN BE FOR AS MANY CHIPS AS YOU WANT, BUT THE POINTS OF THE CHIPS CAN NOT BE THE SAME.
5. ANY COLOR CAN BE TRADED FOR ANY OTHER COLOR AS LONG AS TIP POINTS ARE NOT EQUAL.
6. IF YOU DO NOT WISH TO TRADE, CROSS YOUR LEGS WHILE YOU ARE EITHER STANDING OR SITTING.
7. YOU MUST READ ALOUD THE OTHER PERSON'S STATEMENTS CARD BEFORE YOU BEGIN TALKING AND NEGOTIATING.

POINTS				
SCORING FOR COLORS	POINTS	SAME COLOR	POINTS	TRADING BONUS
BLUE	80	5	25	25
YELLOW	25			
GREEN	15	4	15	
RED	10			
WHITE	5	3	10	

RULES
ROUND THREE

1.
2.
3.
4.
5.
6.
7.
8.

POINTS				
SCORING FOR COLORS	POINTS	SAME COLOR	POINTS	TRADING BONUS
YELLOW	80	5	25	25
BLUE	25			
WHITE	15	4	15	
GREEN	10			
RED	5	3	10	

RULES
ROUND ONE

1. ALL CHIPS MUST BE KEPT HIDDEN.
2. PLAYERS MUST HOLD HANDS TO EVEN BEGIN TALKING.
3. PLAYERS MUST KEEP HOLDING HANDS UNTIL A TRADE HAS BEEN MADE.
4. ALL TRADES MUST BE ONE CHIP FOR ONE CHIP.
5. CHIPS OF THE SAME COLOR CANNOT BE TRADED FOR EACH OTHER.
6. IF YOU DO NOT WISH TO TRADE, SIMPLY FOLD YOUR ARMS.
7. A MAJORITY VOTE CAN EXPEL A PLAYER FROM A GROUP.

POINTS				
SCORING FOR COLORS	POINTS	SAME COLOR	POINTS	TRADING BONUS
YELLOW	80	5	25	1
GREEN	25			
RED	15	4	15	
WHITE	10			
BLUE	5	3	10	

RULES
ROUND TWO

1. ALL CHIPS MUST BE KEPT HIDDEN.
2. PLAYERS MUST HOLD HANDS TO EVEN BEGIN TALKING.
3. PLAYERS MUST KEEP HOLDING HANDS UNTIL A TRADE HAS BEEN MADE.
4. ALL TRADES MUST BE ONE CHIP FOR ONE CHIP.
5. CHIPS OF THE SAME COLOR CANNOT BE TRADED FOR EACH OTHER.
6. IF YOU DO NOT WISH TO TRADE, SIMPLY FOLD YOUR ARMS.
7. A MAJORITY VOTE CAN EXPEL A PLAYER FROM A GROUP.

POINTS				
SCORING FOR COLORS	POINTS	SAME COLOR	POINTS	TRADING BONUS
YELLOW	80	5	25	1
GREEN	25			
RED	15	4	15	
WHITE	10			
BLUE	5	3	10	

RULES
ROUND THREE

1. ALL CHIPS MUST BE KEPT HIDDEN.
2. PLAYERS MUST HOLD HANDS TO EVEN BEGIN TALKING.
3. PLAYERS MUST KEEP HOLDING HANDS UNTIL A TRADE HAS BEEN MADE.
4. ALL TRADES MUST BE ONE CHIP FOR ONE CHIP.
5. CHIPS OF THE SAME COLOR CANNOT BE TRADED FOR EACH OTHER.
6. IF YOU DO NOT WISH TO TRADE, SIMPLY FOLD YOUR ARMS.
7. A MAJORITY VOTE CAN EXPEL A PLAYER FROM A GROUP.

NEW RULE 8.

POINTS				
SCORING FOR COLORS	POINTS	SAME COLOR	POINTS	TRADING BONUS
YELLOW	80	5	25	1
GREEN	25			
RED	15	4	15	
WHITE	10			
BLUE	5	3	10	

HEURISTIC COMPARISON OF PROFILES OF THIRTEEN SOCIAL SYSTEMS WITH THAT OF THE EXTENDED DURATION SPACE SHIP (VOYAGE TO MARS: SELLS, 1966a, AND 1968, PAGES 42-43)

Ratings indicate degree of similarity to the Extended Duration Space Ship social system (8-12 crew members) on the following basis: 2 = highly similar, 1 = moderately similar, 0 = dissimilar or unrelated.

COMPARISON SYSTEM

SYSTEM CHARACTERISTICS	1 Exploration Parties	2 Submarines	3 Naval Ships	4 Bomber Crews	5 Remote Duty Stations	6 Professional Athletic Teams	7 Industrial Work Groups	8 Shipwrecks and Disasters	9 POW Situations	10 Prison Society	11 Mental Hospital Wards	12 LOW CHANGE EXPERIMENTAL SIMULATION	13 HIGH CHANGE EXPERIMENTAL SIMULATION	Explanation for Rating Assigned to High/Low Change Experimental Simulations when Compared to Extended Duration Space Ship
I. Objectives and Goals														
1. Formally prescribed	1	2	2	2	2	2	2	0	1	1	1	2	2	Formally prescribed objectives and goals
2. Mandatory	1	2	2	2	2	1	1	0	1	1	1	1	1	Participation is more permissive and voluntary than mandatory
3. Formal authority	1	2	2	2	2	1	1	0	1	1	1	2	2	Formal authority of recorded instructions is used to assure fidelity of simulation treatments across replications
4. Polarization	2	1	1	2	1	2	1	0	0	0	0	2	2	High degree of polarization toward the goal of winning; high levels of engaging in behavior perceived to be instrumental
5. Remoteness of goals	1	2	2	0	2	1	1	0	2	0	0	0	0	Goals very immediate
6. Success criteria	2	2	1	2	0	2	1	0	2	1	1	2	2	Success criteria very clear and specific
7. Success uncertainty	2	2	2	2	1	2	1	2	2	0	0	2	2	High degree of success uncertainty or risk is created by random assignment to different treatments

	1	2	3	4	5	6	7	8	9	10	11	12	13	
II. Value Systems														
8. Obedience to command	1	2	2	2	2	1	1	0	1	0	0	2	2	High obedience to tape recorded instructions, and high control of member behavior by group pressures for conformity to rules of game
9. Mission emphasis	1	2	2	2	2	1	1	0	0	0	0	1	1	Moderate willingness to engage in behaviors to assure goal attainment
10. Respect for individual lives	2	2	2	2	2	0	1	0	1	0	1	2	2	High respect accorded to the individual
11. High national priority	0	1	1	1	1	0	0	0	0	0	0	0	0	Low national priority; low preeminence in social esteem
12. Military tradition in personal attitudes	0	2	2	1	1	0	0	0	2	0	0	0	0	Attitudes not assumed to favor military values of acceptance of discipline, respect for rank, acceptance of personal hardships and authority, masculinity, and patriotism
13. Acceptance of American way of life	0	2	2	1	1	0	0	0	0	0	0	0	0	Low implied conformity to dominant mores and values of society
III. Personnel Composition														
14. Intellectual	1	1	0	0	0	0	0	0	0	0	0	2	2	Above average intellectual level of undergraduate/graduate college students
15. Educational level	1	1	0	0	0	0	0	0	0	0	0	1	1	Above average educational level of undergraduate/graduate students
16. Extent of relevant training	1	1	1	0	1	1	1	0	1	0	0	1	1	Some transfer from previous situations
17. Extent of relevant experience	2	1	1	0	0	1	1	0	0	1	0	1	1	Some similar prior experiences
18. Personality selectivity	1	1	0	1	0	0	0	0	0	0	0	0	0	Low selectivity: Volunteers randomly assigned
19. Moral selectivity	1	1	0	1	1	0	0	0	0	0	0	0	0	Low selectivity: Volunteers randomly assigned
20. Physical selectivity	1	1	1	1	1	1	0	0	1	0	0	0	0	Low selectivity: Volunteers randomly assigned
21. Possession of requisite skills	2	1	1	1	1	2	1	0	0	0	0	1	1	Some trading and bargaining skills; arithmetic skills; capacity for following directions
22 Motivation to participate	2	1	0	0	0	1	0	0	0	0	0	2	2	High motivation to participate since participants are volunteers

	1	2	3	4	5	6	7	8	9	10	11	12	13	
23. Sex of participants	2	2	2	2	2	2	0	0	2	0	0	0	0	Males and females accepted as volunteers with no discrimination
24. Age range	1	1	0	0	0	2	0	0	0	0	0	2	2	Age range restricted to undergraduate and graduate students
25. Presence of non-crew personnel	2	1	0	0	0	0	0	0	0	0	0	2	2	Simulation directors facilitate compliance with instructions, producing a director-participant dichotomy
26. Rank distribution (all "officers")	1	0	0	0	0	0	0	0	0	0	0	1	1	Director-participant dichotomy
IV. Organization														
27. Formal structure	1	2	2	2	2	1	1	0	1	0	0	2	2	Formalized stratification by status levels inherent in high, medium, and low resource levels due to biased manipulation
28. Prescribed roles	2	2	2	2	2	1	1	0	1	0	0	2	2	Roles highly prescribed in terms of participation, interpersonal distance, rules for succession of position, and interaction
29. Command structure	1	2	2	2	2	1	0	0	1	0	0	2	2	Command structure is clear, and is dictated by audiotaped instructions
30. Centralized authority	1	2	2	2	2	1	0	0	0	0	0	2	2	Highly centralized authority resides in structure of simulation itself (rules, roles, objectives, scoring)
31. Chain of command with provision for succession	1	2	2	2	2	0	0	0	1	0	0	1	1	Chain of command implied by group membership provision for succession, accomplished by granting differential rule making authority depending on resources
32 Extensive back-up organization	1	2	2	2	2	0	0	0	1	0	0	0	0	No back-up organization exists
33. Low autonomy re goals	1	2	2	2	2	0	1	0	0	0	0	2	2	Participants have no autonomy with regard to goal of winning superimposed by the game format of the simulation
34. Group size (8-12)	0	0	0	0	0	0	0	0	0	0	0	0	0	Group size averages 24, with 8 participants in each of three groups
35. Prescribed discipline	1	2	2	2	2	1	0	0	1	2	1	2	2	Corrections/reminders givern for rule infractions; prespecified disciplinary guidelines for removal from simulation occurs if infractions are flagrant or physical confrontation occurs

	1	2	3	4	5	6	7	8	9	10	11	12	13	
36. Low prescribed social distance among crew	2	0	0	0	2	0	0	0	0	0	0	2	2	Hands of others required to be continuously held as a prerequisite to communication
37. Congruency of rank and status	2	2	1	1	1	0	0	0	0	0	0	2	2	Congruence of the experimentally created levels of rank and status is based on resources acquired within the simulated social system; although there is no necessary consistency with personal status existing beyond parameters of the simulation, within the simulation, at least, one's rank is a function of one's resources, and one's status is identical with one's rank or resources position
V. Technology														
38. High technologic complexity	1	2	1	1	1	0	0	0	0	0	0	1	1	Participation in a simulation which includes interaction with its materials (multi-media audio-visual) and specialized system of rules involves a moderate level of technologic complexity
39. Relation to aviation tradition	0	1	1	1	2	0	0	0	0	0	0	0	0	Low relation to aviation tradition
40. Use of simulators and other technical training devices	0	1	1	1	1	0	0	0	0	0	0	0	0	No training given as preparation for participation in the simulation
41. Extensive preparation for missions	2	1	1	1	0	1	0	0	0	0	0	0	0	No preparation is given for events; naivete of participants randomly distributed
42. Use of technical language in execution	2	2	1	1	1	1	0	0	0	0	0	1	1	Rules, roles, and resource system create some new terms and procedures
43. Physical preconditioning	1	1	1	1	0	1	0	0	0	0	0	0	0	No physical preconditioning conducted
44. Scientific principles involved	1	1	1	1	1	0	0	0	0	0	0	0	0	Although knowledge of game theory-based strategies and bargaining and negotiating skill could improve performance, no explicit awareness of these principles is encouraged or assumed. Since resources are experimentally manipulated, knowledge of scientific principles is not likely to contribute very much to success.

	1	2	3	4	5	6	7	8	9	10	11	12	13	
VI. Physical Environment														
45. Required physiological protection and life support	1	2	0	0	0	0	0	0	0	0	0	0	0	No physiological protection and/or life support system is present
46. Extreme remoteness from base	1	1	1	1	1	0	0	1	2	1	1	0	0	Simulation enactment occurs within normal university educational setting of classrooms
47. Presence of unknown environmental hazards	2	1	1	1	0	0	0	2	2	0	1	0	0	Some of the environmental barriers to interaction created during the simulation may have been previously experienced by participants at least singly, if not in combination
48. Extreme confinement in capsule	0	1	0	0	1	0	0	0	2	2	2	1	1	Short term confinement of groups to different part of classroom space occurs for duration of simulation; allocation of persons to space deliberately manipulated
49. High endurance demands	2	1	0	0	0	1	0	2	2	1	0	0	0	Participation in an intensive, competitive social situation occurs for the duration of only 64 minutes
50. Reduced communication	1	1	1	1	1	0	0	2	2	2	2	2	2	Clear restriction of normal communication patterns occurs
51. Social isolation	1	1	1	1	1	0	0	2	2	2	2	1	1	Intensification of social interaction occurs; social isolation more difficult, but clearly accentuated when occurring
52. Maneuvering situation	2	1	1	1	0	1	0	0	0	0	0	1	2	There are limited and highly controlled opportunities for mobility and movement
53. Embedded environmental stresses	2	2	1	1	1	0	0	0	2	0	1	1	2	The manipulation of high or low levels of change, and the biased allocation of high, medium, or low resources implicitly imbeds potential stresses by creating differential levels of information overload and probabilities of achieving success in acquiring a high score

	1	2	3	4	5	6	7	8	9	10	11	12	13	
VII. Temporal Characteristics														
54. Long duration of exposure	1	1	1	1	1	0	0	0	2	2	2	0	0	Very short duration of exposure
55. Total environmental situation	2	2	0	0	2	0	0	0	2	2	2	2	2	The characteristics of information, people, organizations, places, and things are highly manipulated to produce total participation for a short time
56. Remoteness of goals	1	1	1	1	1	1	0	0	2	2	2	1	2	Although the simulation game has a superimposed goal of winning, there are differing amounts of interference with the likelihood of success in achieving goals, depending upon amount of change or turmoil in the simulation environment

Table

ANALYSIS OF SYSTEM SIMILARITIES BY DESCRIPTIVE CATEGORY
(Based on Sells, 1968, page 43)

Ratings indicate degree of similarity on the following basis: 2 = over 70 percent of the items in Table match, 1 = 31 to 70 percent of the items in Table match, 0 = less than 30 percent of the items in Table match

	SYSTEM CHARACTERISTICS						
COMPARISON SYSTEMS	I OBJECTIVES AND GOALS	II VALUE SYSTEMS	III PERSONNEL COMPOSITION	IV ORGANIZATION	V TECHNOLOGY	VI PHYSICAL ENVIRONMENT	VII TEMPORAL CHARACTERISTICS
1. Exploration parties	2	1	1	1	1	1	1
2. Submarines	2	2	1	2	1	1	1
3. Naval ships	2	2	0	2	1	1	0
4. Bomber crews	2	2	1	2	1	1	0
5. Remote duty stations	2	2	0	2	1	0	1
6. Professional athletic teams	2	0	1	0	0	0	0
7. Industrial work groups	1	0	0	0	0	0	0

	I	II	III	IV	V	VI	VII
8. Shipwrecks and disasters	0	0	0	0	0	1	0
9. POW situations	1	1	0	0	0	2	2
10. Prison society	0	0	0	0	0	1	2
11. Mental hospital wards	0	0	0	0	0	1	2
12. Low Change Experimental Simulation	2 (71%)	1 (40%)	1 (33%)	2 (80%)	0 (0%)	0 (13%)	1 (33%)
13. High Change Experimental Simulation	2 (71%)	1 (40%)	1 (33%)	2 (80%)	0 (0%)	1 (38%)	2 (67%)